

WHAT IS CLAIMED IS

1. A vehicle tiredness alleviating system provided with at least one of a vehicle air-conditioning system for controlling a temperature in a passenger compartment, a seat heating system for heating the surface of a seat, and a seat vibration system for repeatedly vibrating a seat for a predetermined time,

said vehicle tiredness alleviating system further provided with a means for judging the tiredness degree of a passenger seated on a seat in said passenger compartment, wherein

said vehicle tiredness alleviating system performs at least one of temperature control of said vehicle air-conditioning system, temperature control of said seat heating system, and control of the vibration strength or vibration time of said seat vibration system based on the tiredness degree of said passenger, which is judged by said means for judging the tiredness degree.

2. A vehicle tiredness alleviating system as set forth in claim 1, wherein:

said seat heating system is provided with a heating means for heating a seat, and

said means for judging the tiredness degree is provided with a seated person information detecting means for detecting seated person information relating to the seated person sitting on said seat, a tiredness judging means for judging if said seated person is tired based on said seated person information, and a heating control means for controlling the heating by said heating means based on the results of judgment by said tiredness judging means.

3. A vehicle tiredness alleviating system as set forth in claim 2, wherein said heating control means makes said heating means heat said seat when said tiredness judging means judges that said seated person is tired.

4. A vehicle tiredness alleviating system as set

forth in claim 3, wherein said heating control means makes said heating means heat said seat for a predetermined duration when said tiredness judging means judges that said seated person is tired.

5. A vehicle tiredness alleviating system as set forth in claim 4, wherein:

said tiredness judging means calculates a tiredness degree showing the extent of tiredness of said seated person based on said seated person information as criteria for judging if said seated person is tired, and

said heating control means determines said predetermined duration based on said tiredness degree.

6. A vehicle tiredness alleviating system as set forth in claim 2, wherein said heating control means sets a target temperature of said seat based on said results of judgment by said tiredness judging means and controls the heating by said heating means so that said seat approaches said target temperature.

7. A vehicle tiredness alleviating system as set forth in claim 6, wherein:

said tiredness judging means calculates a tiredness degree showing the extent of tiredness of said seated person based on said seated person information as criteria for judging if said seated person is tired, and

said heating control means determines said target temperature based on said tiredness degree.

8. A vehicle tiredness alleviating system as set forth in claim 7, wherein said heating control means sets said target temperature to a first predetermined temperature when said tiredness degree is a first predetermined value to less than a second predetermined value and sets said target temperature to a second predetermined temperature higher than said first predetermined temperature when said tiredness degree is the second predetermined value or more.

9. A vehicle tiredness alleviating system as set forth in claim 8, wherein said first predetermined

temperature is a temperature close to human skin temperature.

10. A vehicle tiredness alleviating system as set forth in claim 7, wherein said heating control means controls heating by said heating means for a predetermined duration so that said seat approaches said target temperature determined based on said tiredness degree when said tiredness judging means judges that said seated person is tired.

11. A vehicle tiredness alleviating system as set forth in claim 10, wherein said heating control means determines said predetermined duration based on said tiredness degree.

12. A vehicle tiredness alleviating system as set forth in claim 5, wherein said heating control means sets said predetermined duration to a first predetermined time when said tiredness degree is a third predetermined value to less than a fourth predetermined value and sets said predetermined duration to a second predetermined time longer than said first predetermined time when said tiredness degree is a fourth predetermined value or more.

13. A vehicle tiredness alleviating system as set forth in claim 2, further provided with:

a cooling means for cooling said seat and
a cooling control means for controlling
cooling by said cooling means based on results of
judgment by said tiredness judging means..

14. A vehicle tiredness alleviating system as set forth in claim 13, wherein said cooling control means causes the cooling of said seat by said cooling means to stop when said tiredness judging means judges that said seated person is tired.

15. A vehicle tiredness alleviating system as set forth in claim 14, wherein said cooling control means causes the cooling of said seat by said cooling means to stop for a predetermined duration when said tiredness judging means judges that said seated person is tired.

16. A vehicle tiredness alleviating system as set forth in claim 15, wherein:

said tiredness judging means calculates a tiredness degree showing an extent of tiredness of said seated person based on said seated person information as criteria for judging if said seated person is tired, and

said cooling control means determines said predetermined duration based on said tiredness degree.

17. A vehicle tiredness alleviating system as set forth in claim 13, wherein said cooling control means sets a target temperature of said seat based on said results of judgment by said tiredness judging means and controls the cooling by said cooling means so that said seat approaches said target temperature.

18. A vehicle tiredness alleviating system as set forth in claim 17, wherein:

said tiredness judging means calculates a tiredness degree showing an extent of tiredness of said seated person based on said seated person information as criteria for judging if said seated person is tired, and

said cooling control means determines said target temperature based on said tiredness degree.

19. A vehicle tiredness alleviating system as set forth in claim 18, wherein said cooling control means sets said target temperature at a first predetermined temperature when said tiredness degree is a first predetermined value to less than a second predetermined value and sets said target temperature to a second predetermined temperature higher than said first predetermined temperature when said tiredness degree is the second predetermined value or more.

20. A vehicle tiredness alleviating system as set forth in claim 19, wherein said first predetermined temperature is a temperature close to human skin temperature.

21. A vehicle tiredness alleviating system as set forth in claim 18, wherein said cooling control means

controls the cooling by said cooling means for a predetermined duration so that said seat approaches said target temperature determined based on said tiredness degree when said tiredness judging means judges that said seated person is tired.

22. A vehicle tiredness alleviating system as set forth in claim 21, wherein said cooling control means determines said predetermined duration based on said tiredness degree.

23. A vehicle tiredness alleviating system as set forth in claim 16, wherein said cooling control means sets said predetermined duration to a first predetermined time when said tiredness degree is a third predetermined value to less than a fourth predetermined value and sets said predetermined duration to a second predetermined time longer than said first predetermined time when said tiredness degree is a fourth predetermined value or more.

24. A vehicle tiredness alleviating system as set forth in claim 2, wherein said seated person information detecting means detects at least one of bio information, motion information, and seated duration of said seated person, as said seated person information.

25. A vehicle tiredness alleviating system as set forth in claim 5, wherein:

said seated person information detecting means detects a heartbeat signal from said seated person as said seated person information and

said tiredness judging means calculates said tiredness degree based on said heartbeat signal.

26. A vehicle tiredness alleviating system as set forth in claim 25, wherein said tiredness judging means calculates a normal number of heartbeats and a current number of heartbeats of said seated person from said heartbeat signal and calculates the ratio by which said current number of heartbeats falls compared with said normal number of heartbeats as said tiredness degree.

27. A vehicle tiredness alleviating system as set

forth in claim 1, wherein:

said seat vibration system has a vibration generating means for making a seat vibrate, and

said means for judging the tiredness degree is provided with:

a seated person information detecting means for detecting seated person information relating to a seated person sitting on said seat,

a tiredness judging means for judging if said seated person is tired based on said seated person information, and

a vibration control means for controlling vibration by said vibration generating means based on results of judgment by said tiredness judging means.

28. A vehicle tiredness alleviating system as set forth in claim 27, wherein said vibration control means causes said vibration generating means to vibrate said seat when said tiredness judging means judges that said seated person is tired.

29. A vehicle tiredness alleviating system as set forth in claim 28, wherein said vibration control means causes said vibration generating means to vibrate said seat for a predetermined duration when said tiredness judging means judges that said seated person is tired.

30. A vehicle tiredness alleviating system as set forth in claim 29, wherein:

said tiredness judging means calculates a tiredness degree showing an extent of tiredness of said seated person based on said seated person information as criteria for judging if said seated person is tired, and

said vibration control means determines said predetermined duration based on said tiredness degree.

31. A vehicle tiredness alleviating system as set forth in claim 27, wherein said vibration control means sets the strength of vibration of said seat based on said results of judgment by said tiredness judging means and

controls vibration by said vibration generating means so that said seat vibrates by said strength.

32. A vehicle tiredness alleviating system as set forth in claim 31, wherein:

said tiredness judging means calculates a tiredness degree showing an extent of tiredness of said seated person based on said seated person information as a criteria for judging if said seated person is tired, and

said vibration control means determines said strength based on said tiredness degree.

33. A vehicle tiredness alleviating system as set forth in claim 32, wherein said vibration control means sets said strength to a first predetermined strength when said tiredness degree is a first predetermined value to less than a second predetermined value and sets said strength to a second predetermined strength higher than said first predetermined strength when said tiredness degree is said second predetermined value or more.

34. A vehicle tiredness alleviating system as set forth in claim 32, wherein said vibration control means controls vibration by said vibration generating means for a predetermined duration so that said seat vibrates by said strength determined based on said tiredness degree when said tiredness judging means judges that said seated person is tired.

35. A vehicle tiredness alleviating system as set forth in claim 34, wherein said vibration control means determines said predetermined duration based on said tiredness degree.

36. A vehicle tiredness alleviating system as set forth in claim 30, wherein said vibration control means sets said predetermined duration to a first predetermined time when said tiredness degree is a third predetermined value to less than a fourth predetermined value and sets said predetermined duration to a second predetermined time longer than said first predetermined time when said

tiredness degree is said fourth predetermined value or more.

37. A vehicle tiredness alleviating system as set forth in claim 27, wherein said seated person information detecting means detects at least one of bio information, motion information, and seated duration of said seated person, as said seated person information.

38. A vehicle tiredness alleviating system as set forth in claim 30, wherein:

said seated person information detecting means detects a heartbeat signal from said seated person as said seated person information, and

said tiredness judging means calculates said tiredness degree based on said heartbeat signal.

39. A vehicle tiredness alleviating system as set forth in claim 38, wherein said tiredness judging means calculates a normal number of heartbeats and current number of heartbeats of said seated person from said heartbeat signal and calculates the ratio by which said current number of heartbeats falls compared with said normal number of heartbeats as said tiredness degree.

40. A vehicle tiredness alleviating system as set forth in claim 1, wherein said means for judging the tiredness degree of said passenger is comprised of:

a pulse wave sensor provided at a driver's seat for detecting a pulse wave of the driver,

a vibration sensor provided at said driver's seat for detecting vibration of said driver's seat,

a pulse wave extracting means for extracting a pulse wave component based on a detection signal of said pulse wave sensor and a detection signal of said vibration sensor, and

a tiredness judging means for judging tiredness of the driver based on a pulse wave component extracted by said pulse wave extracting means and outputting a command signal based on said judged

tiredness to an air-conditioning system unit of said vehicle air-conditioning system.

41. A vehicle tiredness alleviating system as set forth in claim 40, wherein said pulse wave sensor is provided at a portion of a high seating pressure at said driver's seat and said vibration sensor is provided at a portion of a low seating pressure at said driver's seat.